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**State of Utah**
**DEPARTMENT OF NATURAL RESOURCES**
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# Technical Analysis and Findings

## Utah Coal Regulatory Program

**PID:** **C0410002**
**TaskID:** **4647**
**Mine Name:** **SUFCO MINE**
**Title:** **REVISION ASSOCIATED WITH SHELTERS**

## Summary

*Deficiencies Details:*

None

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## Environmental Resource Information

### Historic and Archeological Resource Information

*Analysis:*

On August 5th the Division received an amendment regarding the potential impacts from subsidence to the two eligible archaeological sites 42SV3550 and 42SV3551 noted in the archaeological survey performed by Scott Billat of EnviroWest on August 25th, 2013. The amendment included text (changes and deletions), a map and a Determination of Significance and Effect document prepared by the Fish Lake and Manti-La Sal National Forests. This analysis will include a review of that information.

On August 19, 2014 the Division contacted the Forest Service (Charmaine Thompson) and SHPO (Chris Merritt) by way of E mail noting that the Division's preliminary findings indicated that (in light of the uncertainty in predicting the precise range of subsidence) neither the mining company nor the Division could definitively state that shelter 42SV3550 would not be impacted by subsidence from longwall mining.

On August 20th, 2014 the Division staff (Dana Dean, Daron Haddock, Steve Christensen and Joe Helfrich) phone conferenced SHPO (Chris Merritt) and the Forest Service (Charmaine Thompson) to discus how to proceed with the current adverse effect determination made by the FS with SHPO concurrence. The recommendations by Chris and Charmaine were to move forward with the development of a Memorandum of Agreement (MOA) that would include a phased data recovery plan and some form of financial educational out reach to the tribes. These recommendations (as noted by Chris and Charmaine) could be worked out in consultation with the mine's contractor. The glitch however is (timing) getting the MOA in place and a recovery plan implemented before the end of September as the mine has indicated that conditions may be unsafe due to the subsidence effects of the longwall operation near the shelter.

On August 28th a site visit to shelter 42SV3550 was conducted by Charmaine Thompson and Joe Helfrich for the sole

purpose of the Forest Service to reevaluate the current (adverse) Determination of Effect. A new map was also provided by SUFCO (Chris Hansen). Based on the site visit and the new map the Forest Service revised their determination of effect document to no adverse effect. SHPO concurrence is pending.

In summary the permittee needs to provide the following information:

The revised Determination of Effect document signed by the Forest Service and SHPO;

A P. E. certified copy of the map that was provided to employees of the Division and Forest Service for the 8/28/2014 site visit to the shelter (42SV3550) and;

the appropriate revisions to the MRP (redline/strikeout not take out).

*Deficiencies Details:*

The information is not adequate to meet the requirements of this section of the regulations. Prior to approval the following information is required in accordance with R645-301-411.140 and 142, 301-130 and 301-512;

The revised Determination of Effect document signed by the Forest Service and SHPO;

A P. E. certified copy of the map that was provided to employees of the Division and Forest Service for the 8/28/2014 site visit to the shelter (42SV3550) and;

The appropriate revisions to the MRP (Engineering, Archaeological, Subsidence in redline/strikeout not take out). Any revisions to the current technical information in the MRP need to include the names of the qualified persons responsible for such changes.

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# Operation Plan

## Protection Public Places

*Analysis:*

The Permittee submitted analytical information describing the geologic conditions of the two rock shelters, 42SV3550 and 42SV3551 on May 29, 2014. The Permittee intends to mine past these two structures when panel 3R2S is extracted using longwall mining methods. The headgate entries (3R2S) was developed using 180' X 125' centers.
The tailgate entries (2R2S) were developed on 180' X 90' centers.
The load bearing capability of the headgate pillars are 33 % more than the load bearing ability of the tailgate pillars. The head gate pillars are designed (25% extraction) to be non-yielding versus yieldable pillars in the 2R2S gate entries.
Chapter 4, page 4-12A of the Task ID # 4601 application states "no mining will occur beneath the two inventoried shelters". The SMA for the land surface where the shelters are located (USFS) processed a "Determination of Significance and Effect (DES) with the Utah SHPO and the agencies determined that there were no other requirements within the DSE needing further action. This design, plus the solid coal on the right side of the 3R2S gate entries will support the two rock shelters and prevent failure of them.
The Determinantion of Significance and Effect document ( ML-13-1452, U-13-EZ-0609f) prepared by the U.S. Forest Service regarding the potential for damage to the rock shelters identified as 42SV3550 and 42SV3551 states in the COMMENTS and COORDINATING REQUIREMENTS that is is likely that the roofs of the two rock shelters will collapse if longwall mining occurs under them.
The Permittee stated in the submitted Task ID # 4601 information that extraction of the coal located beneath the shelters will not occur. Also, non-yielding pillars have been designed for the headgate entries which provide additional support to the shelter area. Therefore the information provided in Task ID # 4601 is sufficient to make the finding that no surface affects will impact the two shelters.
This analysis disagrees with the findings made previously by the Division and the U.S. Forest Service Determination of Significance and Effect.

Since both shelters have been inventoried, and they rest on overburden which will not be undermined, adjacent to support pillars which are designed to not yield, it appears that there is no reason to not allow mining past the two rock shelters from the 3R2S head gate entries.

A 15 degree angle of draw was used to determine the possible area of subsidence affects which could be measured or observed at either of the rock shelters. Chapter 5, pages 5-22 and 5-23, section 5.2.5 Subsidence, state the following:

1) “Longwall mining was introduced at the SUFCO Mine in October 1985, when a longwall system was added…

2) the maximum subsidence caused by longwall mining to date has been 7 feet…several draw angle surveys have been performed at the mine over the past fourteen years.

3) These surveys have been oriented both parallel and perpendicular to the long axis of the panel.

4) Data collected over continuous-miner areas to date indicated that the average draw angle is 15 degrees. Individual measurements over continuous miner areas have ranged from 10 to 21 degrees.

5) New longwall draw angle data obtained in 1995 indicates an angle of 15 degrees for the longwall areas.

6) Draw angle study completed in 1999 over the 13L4E LW panel indicates 15 degrees is valid. Summary results of the LW panel studies are shown in Figures 5-0A and 5-0B.

Therefore, the use of a 15 degree angle of draw to determine areas where potential impacts might occur is valid.

The drawing “Projected Subsidence Analysis SUFCO 3R2S/South Fork Quitchupah Shelter Area” indicates zero subsidence between the intake entry and the return entry as well as zero subsidence from the return entry to 350 feet to the ENE (through 42SV3550).

The Permittees thorough analysis of the geologic conditions associated with the two shelters confirms this.

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